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PATENT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PRIMARY EXAMINER**

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Application of:

Applicant: Paul S. Prevey III

Serial No.: 09/516,327

Filed: March 1, 2000

Art Unit: 2855

Docket: LRI-004PAT

Examiner: Lilybett Martir

Title: **METHOD FOR REDUCING RESIDUAL STRESS ZONES IN THE
SURFACE OF A PART**

**AMENDMENT AND RESPONSE TO THE OFFICE ACTION
DATED JULY 5, 2002**

Honorable Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

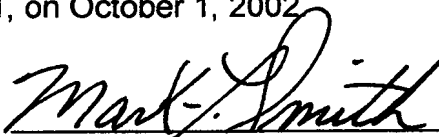
RESPONSE

This is in response to the Office Action dated July 5, 2002.

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231, on October 1, 2002.

October 1, 2002


Mark F. Smith

LRI-004PAT

The rejection of Claims 1 - 11 under 35 U.S.C. 103(a) as being anticipated by U.S. Patent No. 5,826,453 to Prevey, III is respectfully traversed.

The Examiner takes the position that independent Claims 1 and 9, as well as all dependent claims, are anticipated by Prevey, III. Referring to Claim 1, the Examiner appears to take the position that Claim 1 discloses a pressure applied such that the magnitude of compression decreases in the direction towards the boundaries of the selected region would obviously result from providing a zone of deformation formed by compressions of different magnitudes that are exerted over a surface in a selected pattern. Further, it would have been obvious at the time the invention was made to modify the teachings of the burnishing method of Prevey, III by applying a pressure in a way such that the magnitude of compression decreases in the direction toward the boundaries of the selected region since the claimed process is a result of selecting a predetermined pattern following the previous teachings of Prevey, III by making it suitable to or fit for a specific use or situation without departing from the scope of his invention for the purpose of making said method versatile and adaptable. The Examiner also takes the position that the application of force to any surface using the burnishing apparatus with a burnishing ball, such as in element 114, produces a surface deformation with less deformation of the surface toward the boundaries of the selected region if a desired path or a predetermined pattern of burnishing selected for that purpose is applied.

The Applicant respectfully submits that Claim 1 requires "...the pressure being applied such that the magnitude of compression decreases in the direction towards the boundaries of the selected region." Claim 9 provides that "...the burnishing operation being performed such that the density of burnishing and the magnitude of compression are varied to reduce the high tensile stress along the boundaries of the selected region."

In contrast, the method taught in Prevey, III provides for directing a burnishing apparatus to make a plurality of passes over a workpiece **to provide the maximum compressive residual stress with the minimum of cold working and surface hardening** (Col.3, lines 5 – 8). The burnishing means is passed is a predetermined pattern across the area to be burnished such that the zones of deformation formed by each pass of the burnishing means do not overlap (Col. 5, lines 4 – 7). While the method of Prevey, III teaches the use of a burnishing apparatus to induce compressive residual stress by directing the burnishing means to make a plurality of passes over the workpiece **such that the zones of deformation formed by each pass do not overlap**, the Applicant is unable to find any teaching or suggestion of applying pressure such that the magnitude of compression *decreases in the direction towards the boundaries of the selected region* or that the *density of burnishing and the magnitude of compression are varied to reduce the high tensile stress along the boundaries of the selected region*. Indeed, the method disclosed in Prevey III, *permits* a process whereby pressure may increase, decrease, or stay the same in the direction towards the boundaries of the selected region and **does not require** that the density and/or direction of burnishing and the magnitude of compression be varied to reduce the high tensile stress zones along the boundaries of the selected region. Indeed, there **must be a selection process** to arrive at the *right* process for achieving the desired result. Further, there is **no teaching** or suggestion that tensile residual stresses exists along the boundaries or that it **would be desirable** to reduce any such tensile stresses near the boundaries or that **the desired method** of reducing such tensile stresses would be by means of gradually reducing the magnitude of compression or the density of burnishing and the magnitude of compression. Such teachings are only taught by the subject application.

The **Examiner admits** that Prevey, III **does not disclose** that the pressure is being applied such that the magnitude of compression decreases in the direction towards the boundaries of the selected region to minimize the effects of tensile stress zones near the boundaries. The Examiner however takes the position that it would be obvious that tensile stress zones

will result from providing a zone of deformation formed by compressions of different magnitudes that are exerted over a surface in a selected pattern. Again the Examiner has **presented no evidence**, other than the Applicant's own specification, as to whether tensile stresses would exist along the boundaries or why it would be obvious to expect such tensile stresses. Accordingly, there is **no incentive** to perform the application of reducing the magnitude of compression towards the boundaries or varying the density of burnishing and the magnitude of compression to reduce high tensile stress along the boundaries of the selected region as a remedy.

The Examiner also takes the position that it would have been obvious to modify the teachings of Prevey, III by applying a pressure in a way such that the magnitude of compression decreases in the direction toward the boundaries of the selected region since the claimed process is a result of selecting a predetermined pattern following the previous teachings of Prevey, III by making it suitable to or fit for a specific use or situation without departing from the scope of the invention for the purpose of making the method versatile and adaptable. The Applicant respectfully submits, however, that the results of the claimed method, i.e. that of minimizing "the effects of any tensile stress zones near the boundaries" (Claim 1) or reducing "the high tensile stress zones along the boundaries of the selected region" **are not inevitable**. As previously stated, the Applicant is unable to find in the reference any teaching or suggestion that by reducing the magnitude of compression in the direction towards the boundaries will reduce the build up of tensile stress.

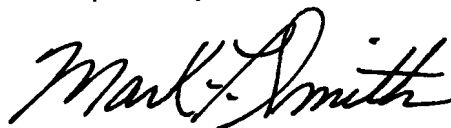
It is well settled that the prior art or the surrounding circumstances must have made any proposed modifications or changes in the prior art obvious to do rather than obvious to try. **In going from the prior art to the claimed invention, one cannot base obviousness upon what a person skilled in the art might try or might find obvious to try but rather must consider what the prior art would have led a person skilled in the art to do.** The Applicant respectfully submits that he is unable to find any teaching in the cited reference that would have led one skilled in the art to determine if high tensile zones may

exist along the boundaries of a workpiece and that by decreasing the magnitude of compression in the direction towards the boundaries or varying the density or the magnitude of compression along the boundaries of the selected region will reduce such tensile stresses and improve the fatigue and/or stress corrosion performance of the part. While Prevey III teaches the advantages of inducing a layer of residual compressive stress along the surface of a workpiece and selecting a pattern and performing the method of directing the burnishing apparatus such that it is passed in a predetermined pattern across the area to be burnished such that the zones of deformation formed by each pass of the burnishing means do not overlap, the *Applicant is unable to find any teaching that would have led a person skilled in the art to select a pattern that not only will ensure that the zones of deformation do not overlap (as taught in Prevey III), but that the magnitude of compression decreases in the direction towards the boundaries in order to reduce the build up of tensile residual stress.* Indeed, the Applicant respectfully submits that for a given workpiece hundreds or thousands of variations could be made before arriving at the optimum stress distribution. Thus, to say that it may be obvious to try a certain pattern is not the test for obviousness. As previously stated, the test for obviousness is that the prior art would lead one skilled in the art to select the desired pattern whereby the magnitude of compression decreases in the direction of the boundaries or that the density of burnishing and the magnitude of compression vary in such a manner to reduce the high tensile stress along the boundaries of the selected region. While someone might fortuitously try such a pattern, there clearly is no teaching that would lead one of ordinary skill in the art to select such a pattern.

In view of the foregoing, the rejection of Claims 1 - 11 as being rejected under 35 U.S.C. 103(a) as being anticipated by Prevey, III should be withdrawn.

In view of the foregoing remarks, it is respectfully submitted that all of the Claims now pending are allowable over the art of record. Reconsideration of all claims now in this application is respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Mark F. Smith". The signature is fluid and cursive, with the first name "Mark" and last name "Smith" clearly distinguishable.

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(Reg. No. 32,437)

October 1, 2002

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